FIG.1

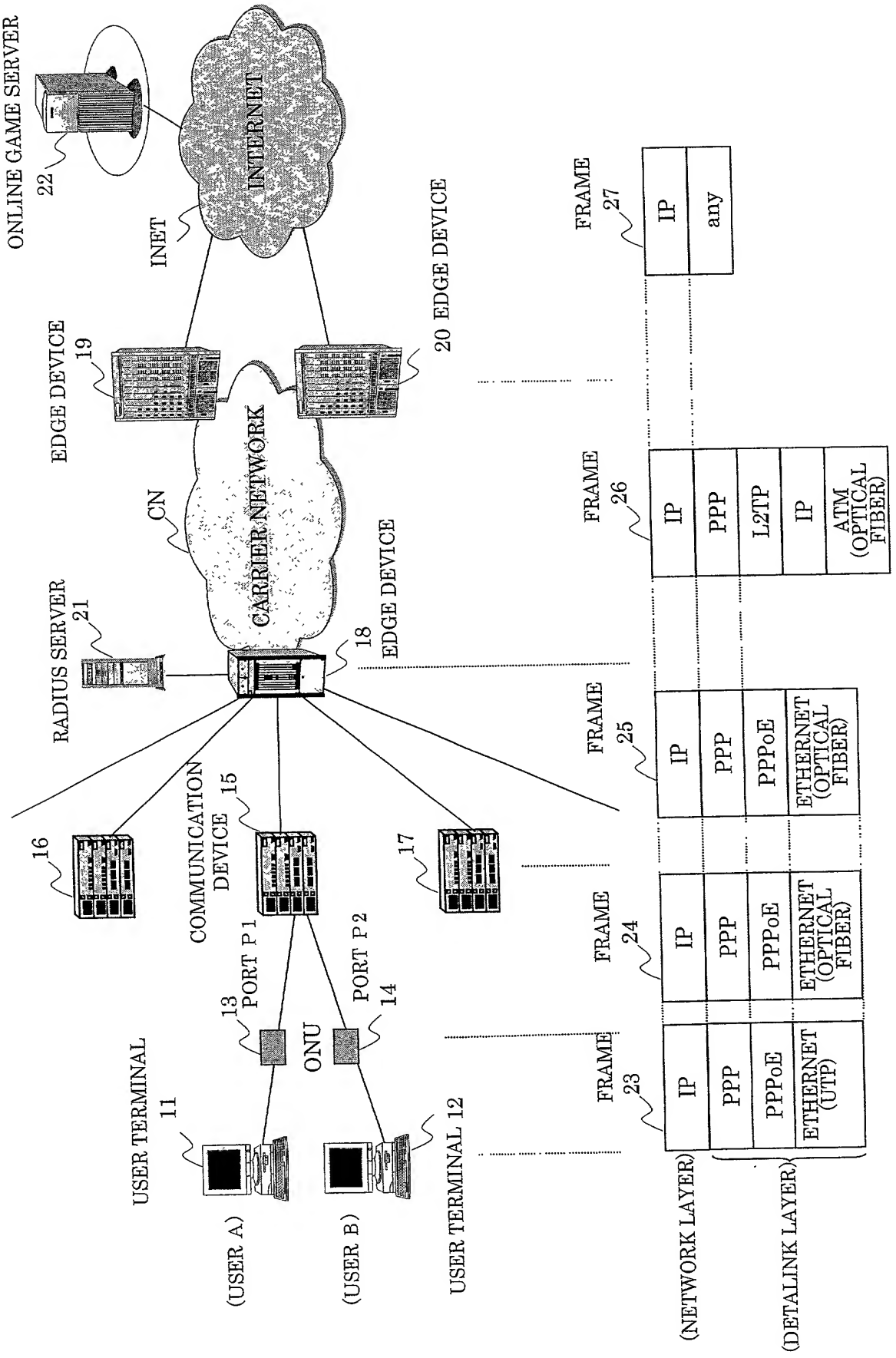
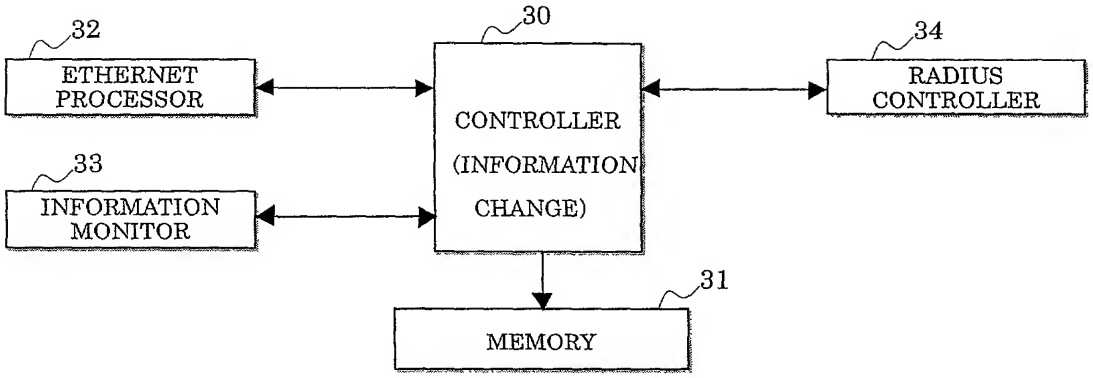

ONLINE GAME SERVER
22
INET
INTERNET
EDGE DEVICE
19
20 EDGE DEVICE
CN
CARRIER NETWORK
RADIUS SERVER
21
18
EDGE DEVICE
16
COMMUNICATION DEVICE
15
17
13
PORT P1
PORT P2
14
ONU
USER TERMINAL
11
USER TERMINAL 12
(USER A)
(USER B)
FRAME
23
FRAME
24
FRAME
25
FRAME
26
FRAME
27
IP
PPP
PPPoE
ETHERNET (UTP)
IP
PPP
PPPoE
ETHERNET (OPTICAL FIBER)
IP
PPP
PPPoE
ETHERNET (OPTICAL FIBER)
IP
PPP
L2TP
IP
ATM (OPTICAL FIBER)
IP
any
(NETWORK LAYER)
(DETALINK LAYER)

FIG.2


32
ETHERNET PROCESSOR
30
CONTROLLER (INFORMATION CHANGE)
34
RADIUS CONTROLLER
33
INFORMATION MONITOR
31
MEMORY

3624307 "2004/0213207"

FIG.3

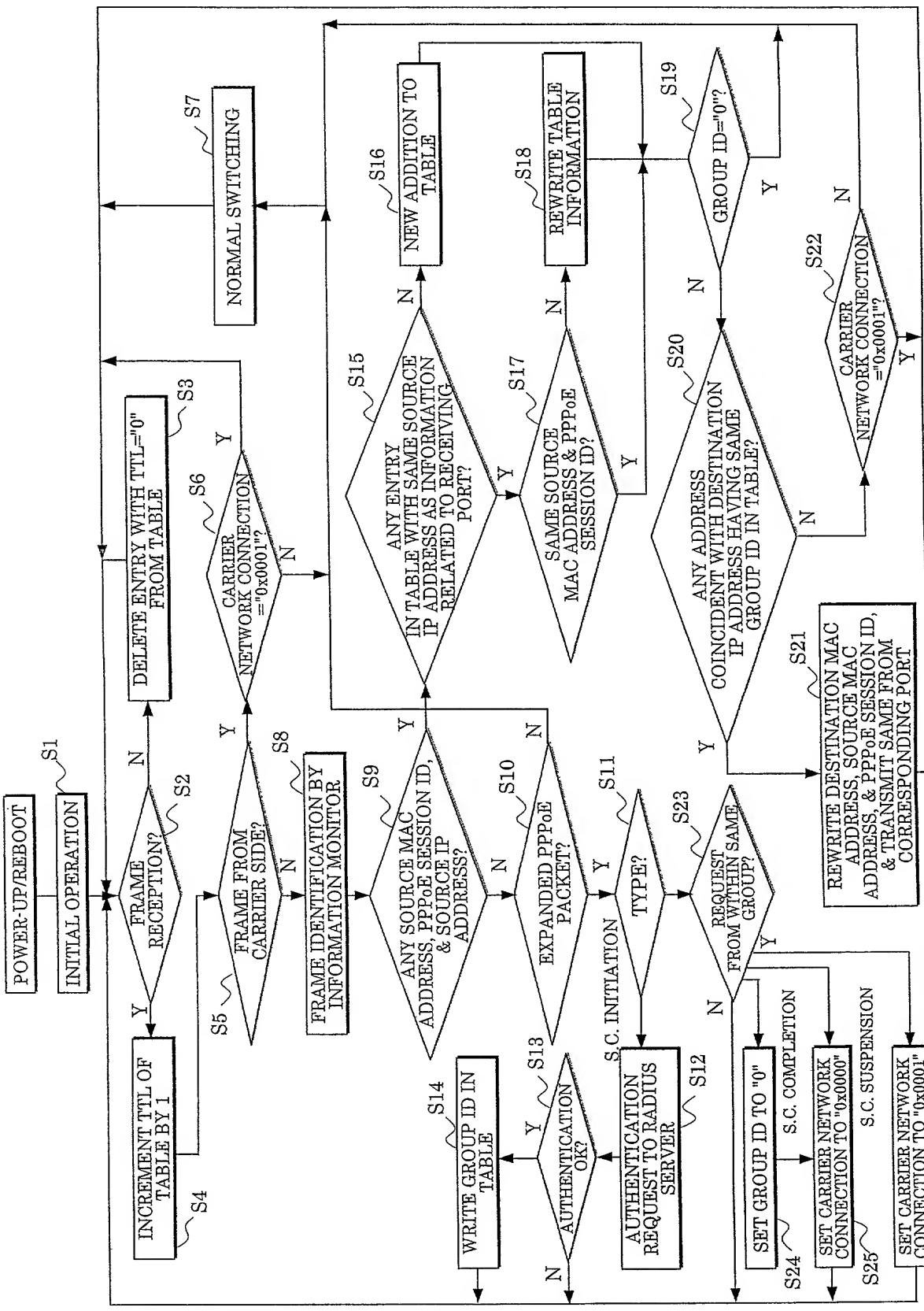


FIG.4

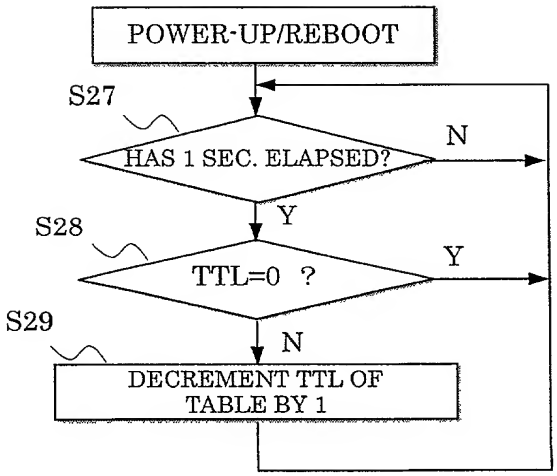


FIG.5

TBL

PORT	MAC ADDRESS	PPPoE SESSION ID	IP ADDRESS	GROUP ID	CARRIER NETWORK CONNECTION AVAILABILITY	TTL
P1	00:00:0E:11:22:xx	0x0001	112.116.5.xxx	0xFD376458	0x0001	0x0020
P2	00:00:0E:22:33:xx	0x0003	168.34.22.xxx	0xFD376458	0x0001	0x003E

FIG.6

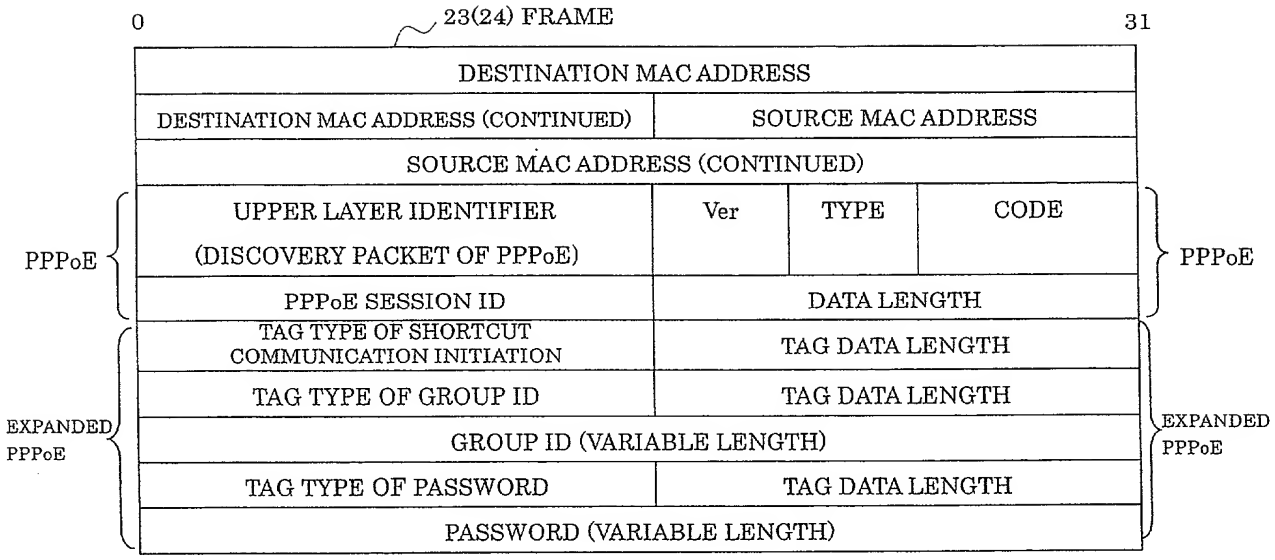


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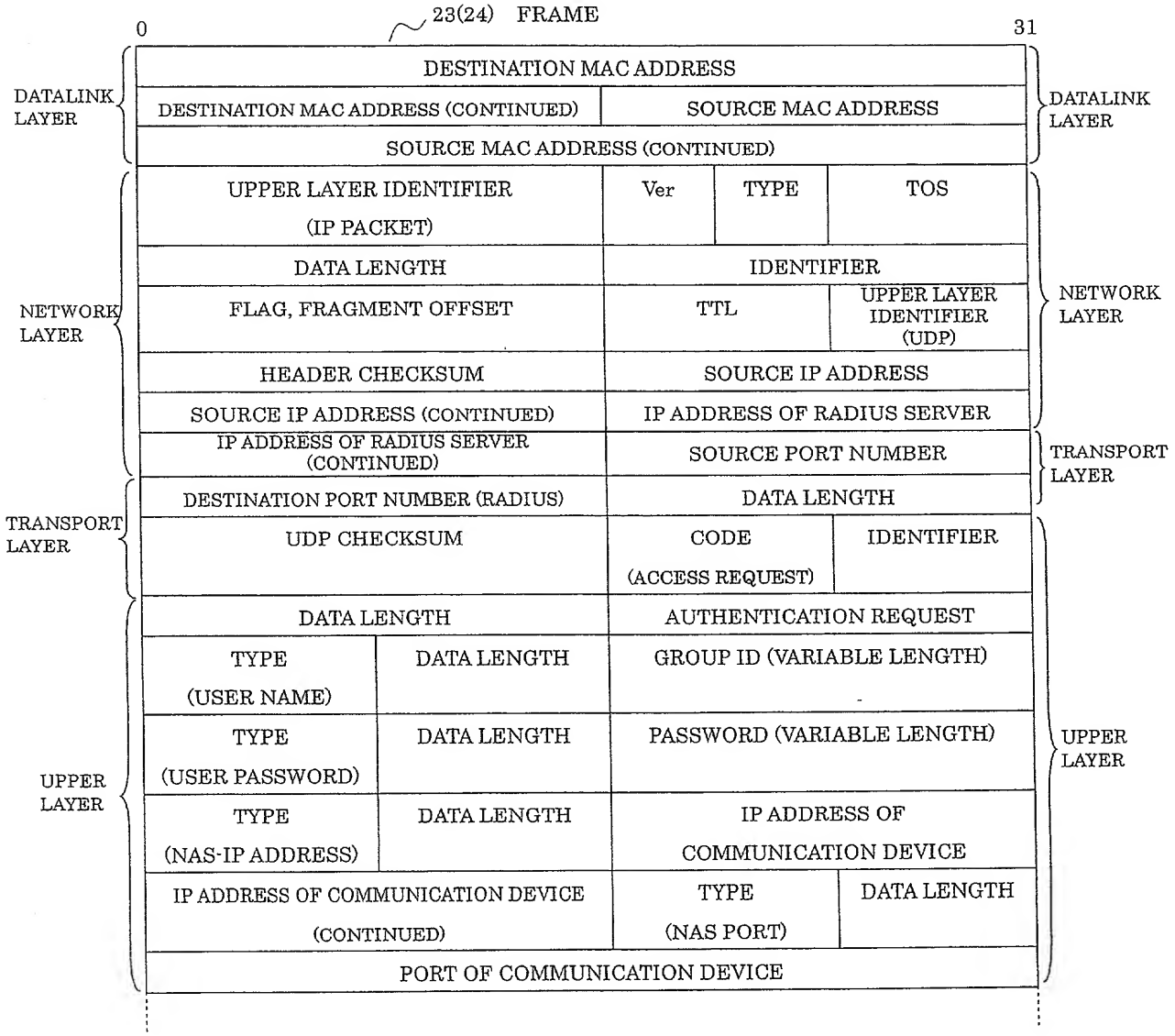
FIG.7


0
23(24) FRAME
31
DATALINK LAYER
NETWORK LAYER
TRANSPORT LAYER
UPPER LAYER
DESTINATION MAC ADDRESS
DESTINATION MAC ADDRESS (CONTINUED)
SOURCE MAC ADDRESS
SOURCE MAC ADDRESS (CONTINUED)
UPPER LAYER IDENTIFIER (IP PACKET)
Ver
TYPE
TOS
DATA LENGTH
IDENTIFIER
FLAG, FRAGMENT OFFSET
TTL
UPPER LAYER IDENTIFIER (UDP)
HEADER CHECKSUM
SOURCE IP ADDRESS
SOURCE IP ADDRESS (CONTINUED)
IP ADDRESS OF RADIUS SERVER
IP ADDRESS OF RADIUS SERVER (CONTINUED)
SOURCE PORT NUMBER
DESTINATION PORT NUMBER (RADIUS)
DATA LENGTH
UDP CHECKSUM
CODE (ACCESS REQUEST)
IDENTIFIER
DATA LENGTH
AUTHENTICATION REQUEST
TYPE (USER NAME)
DATA LENGTH
GROUP ID (VARIABLE LENGTH)
TYPE (USER PASSWORD)
DATA LENGTH
PASSWORD (VARIABLE LENGTH)
TYPE (NAS-IP ADDRESS)
DATA LENGTH
IP ADDRESS OF COMMUNICATION DEVICE
IP ADDRESS OF COMMUNICATION DEVICE (CONTINUED)
TYPE (NAS PORT)
DATA LENGTH
PORT OF COMMUNICATION DEVICE

FG109(7

FIG.8

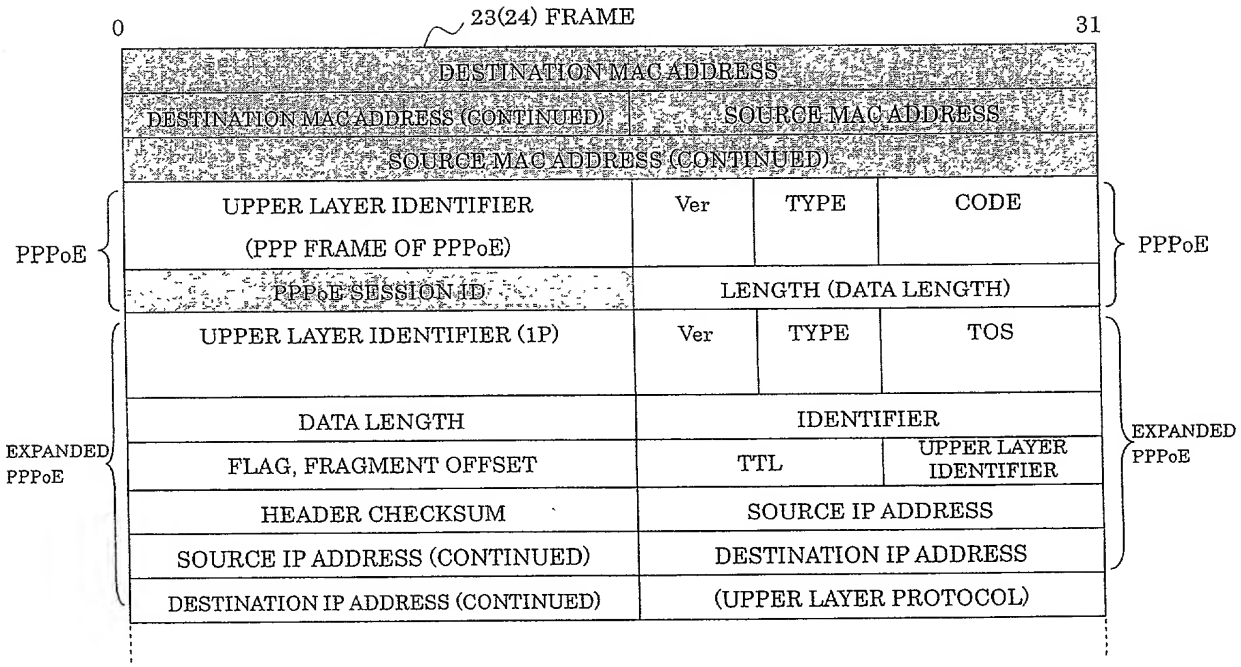


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FIG.9

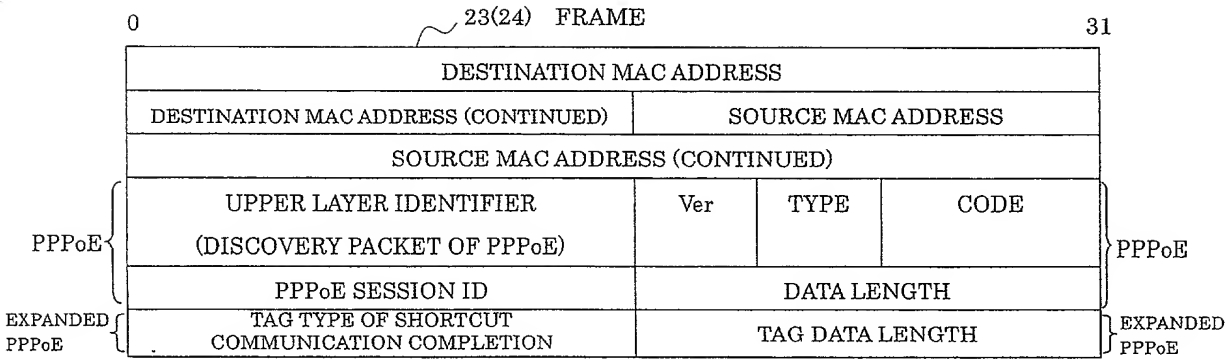
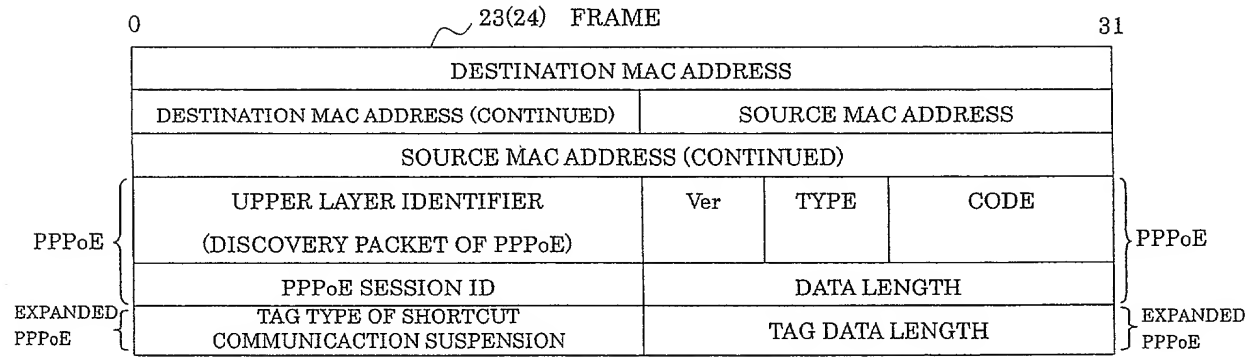


FIG.10



Indeed Prosecution

FIG.11

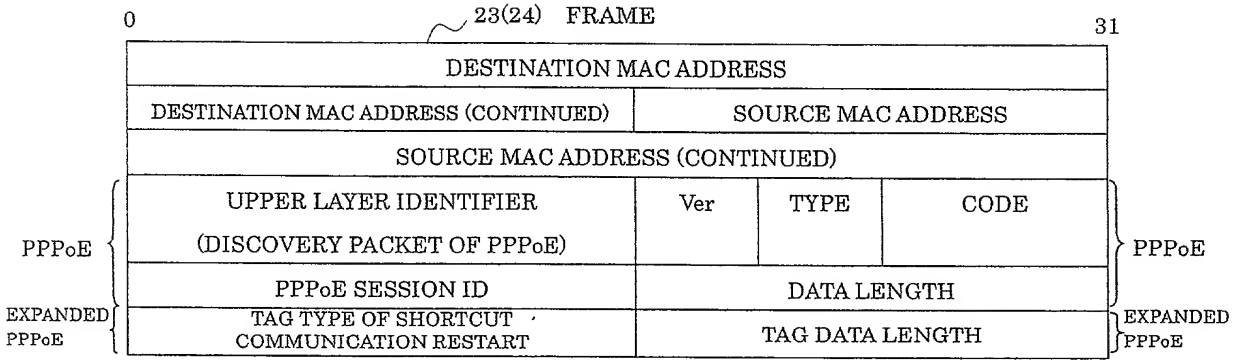

0
23(24) FRAME
31
DESTINATION MAC ADDRESS
DESTINATION MAC ADDRESS (CONTINUED)
SOURCE MAC ADDRESS
SOURCE MAC ADDRESS (CONTINUED)
PPPoE
UPPER LAYER IDENTIFIER
(DISCOVERY PACKET OF PPPoE)
Ver
TYPE
CODE
PPPoE
PPPoE SESSION ID
DATA LENGTH
EXPANDED PPPoE
TAG TYPE OF SHORTCUT COMMUNICATION RESTART
TAG DATA LENGTH
EXPANDED PPPoE

FIG.12

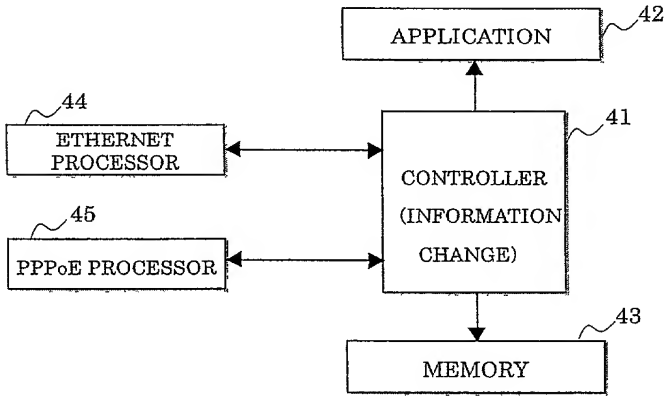

APPLICATION
42
44
ETHERNET PROCESSOR
41
CONTROLLER (INFORMATION CHANGE)
45
PPPoE PROCESSOR
43
MEMORY

FIG.13

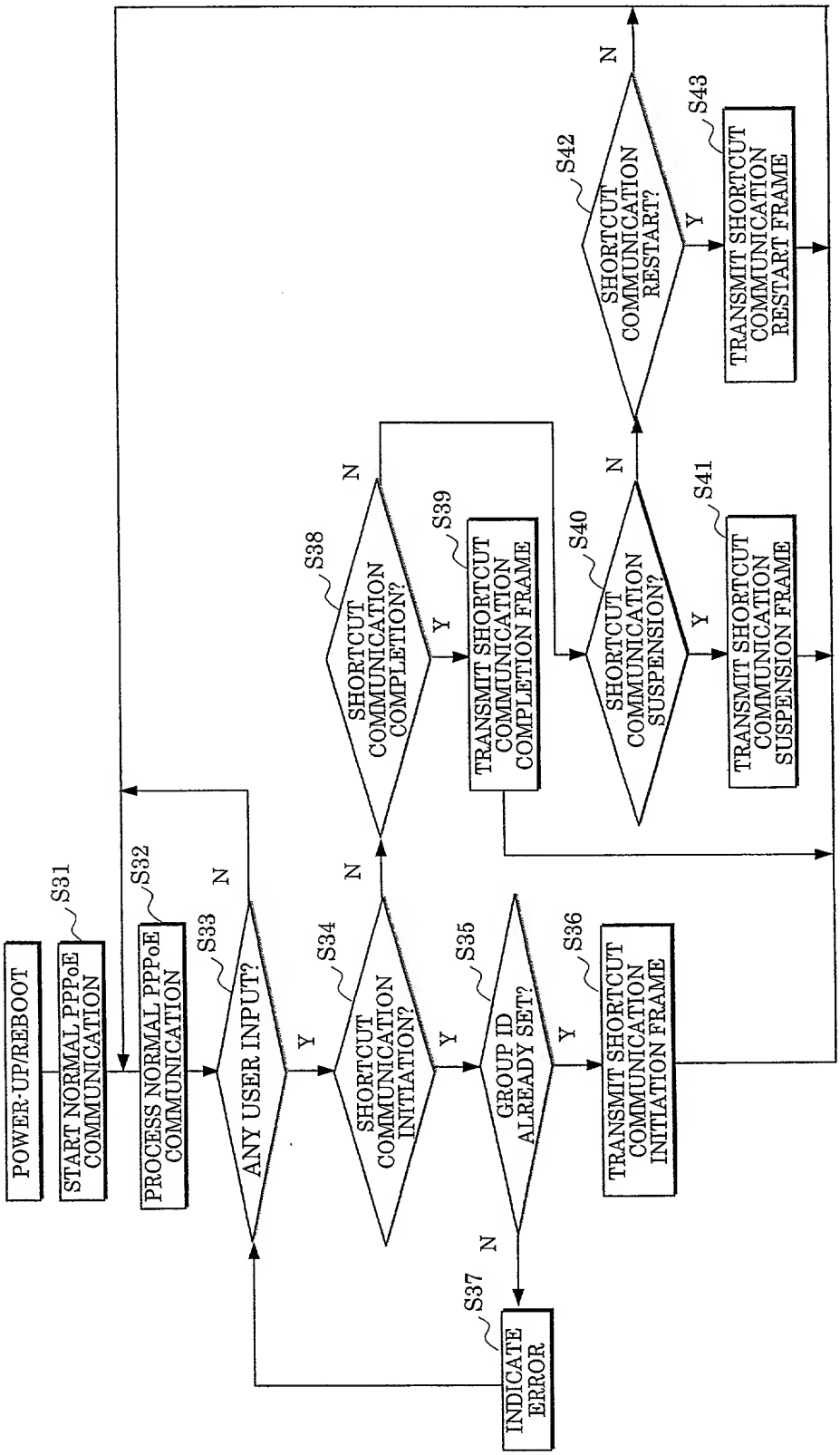

POWER-UP/REBOOT
S31
START NORMAL PPPoE COMMUNICATION
S32
PROCESS NORMAL PPPoE COMMUNICATION
S33
ANY USER INPUT?
Y
N
S34
SHORTCUT COMMUNICATION INITIATION?
Y
N
S35
GROUP ID ALREADY SET?
Y
N
S36
TRANSMIT SHORTCUT COMMUNICATION INITIATION FRAME
S37
INDICATE ERROR
S38
SHORTCUT COMMUNICATION COMPLETION?
Y
N
S39
TRANSMIT SHORTCUT COMMUNICATION COMPLETION FRAME
S40
SHORTCUT COMMUNICATION SUSPENSION?
Y
N
S41
TRANSMIT SHORTCUT COMMUNICATION SUSPENSION FRAME
S42
SHORTCUT COMMUNICATION RESTART?
Y
N
S43
TRANSMIT SHORTCUT COMMUNICATION RESTART FRAME

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FIG.14

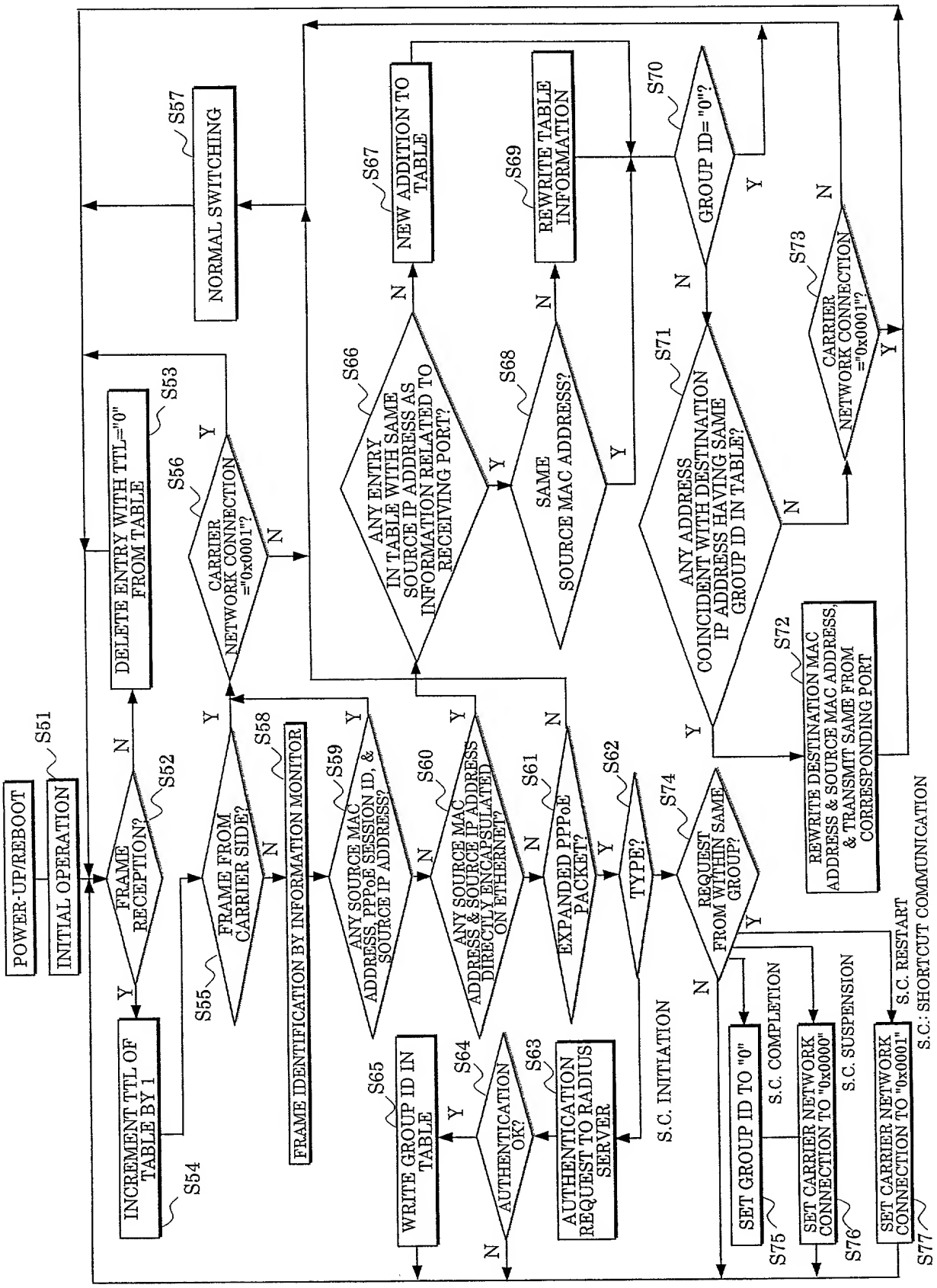
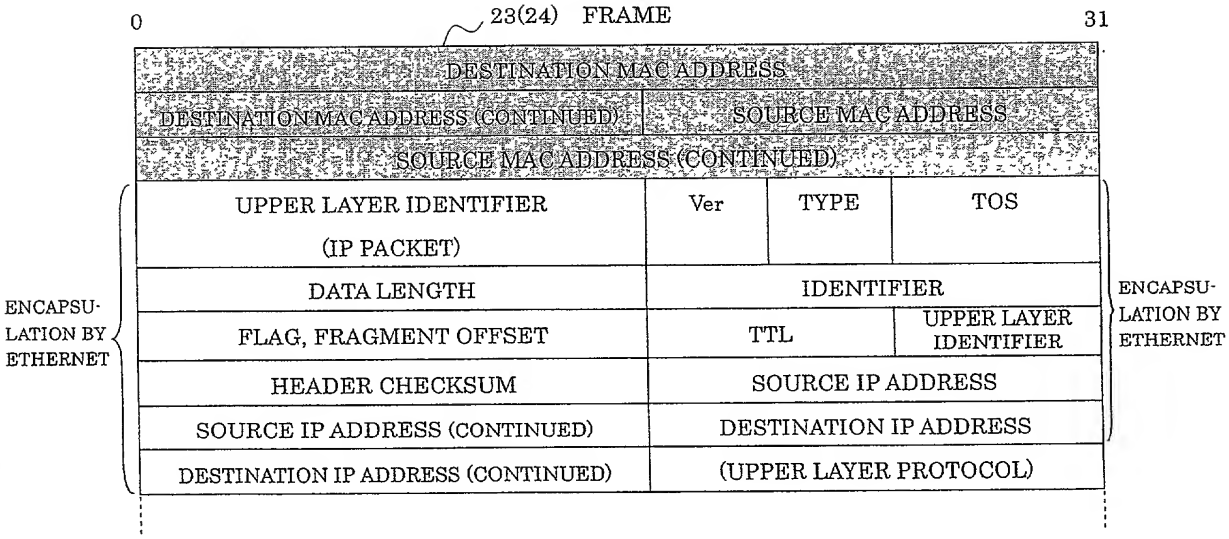


FIG.15



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2003-254207
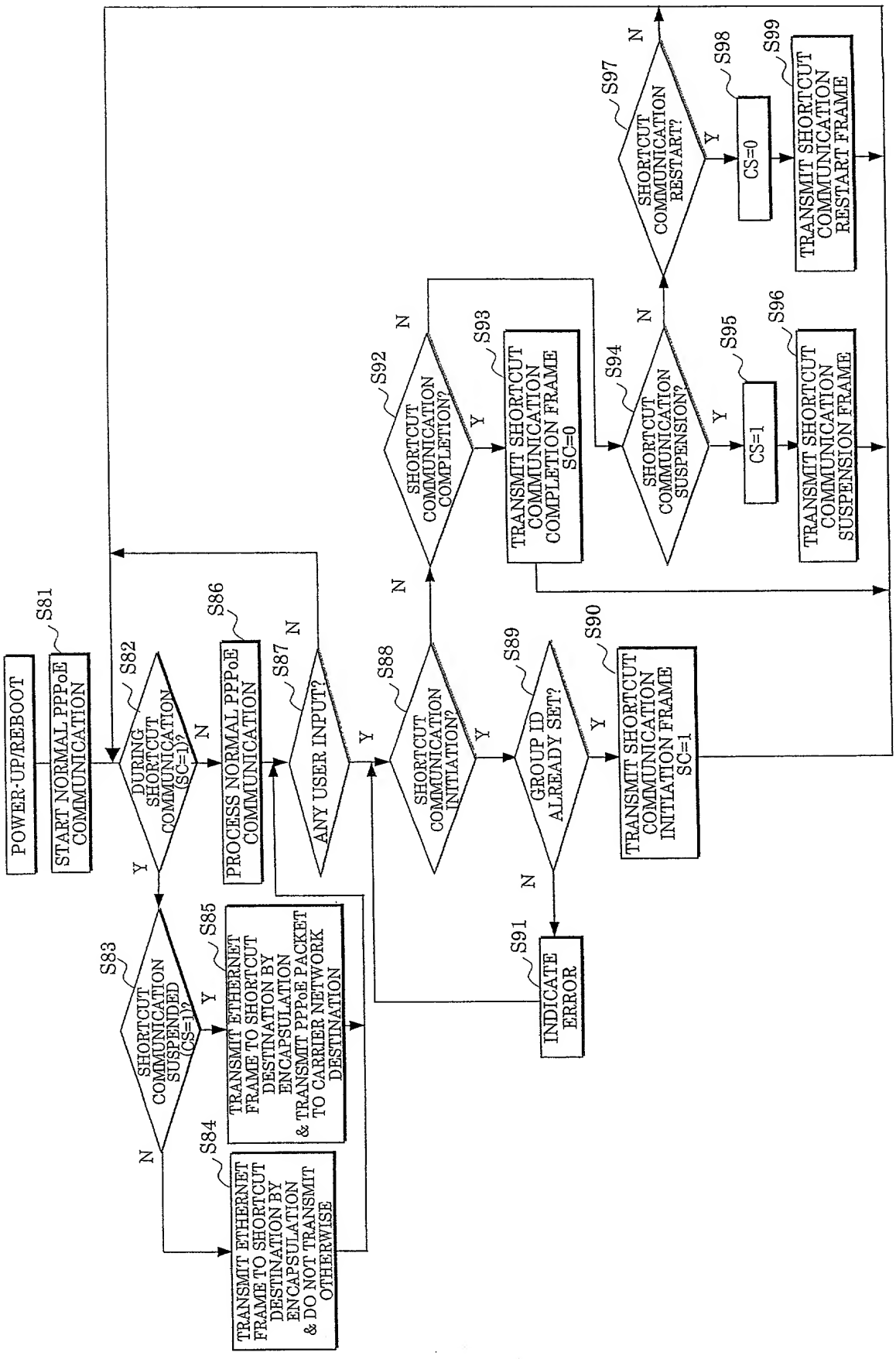
FIG.16